ability to classify their knowledge and lay the basis of a science as did the people of the Occident. This was done by the Greeks. Thales, one of the seven sages of Greece, has been called the father of astronomy. He first taught that the earth was round and that the moon receives its light from the sun. This was 640 B. C. He also determined when the equinoxes and solstices occur and predicted an eclipse of the sun which is famous in history for having terminated a war between the Medes and the Lydians. Anaximander, 611 B. C., invented the sun-dial and explained the causes of the moon's phases. Pythagoras, 582 B. C., founded an astronomical school at Cretona, Italy, where he educated hundreds of enthusiastic pupils. He also taught that the sun was the center of the solar system, and although a great and imaginary dreamer, he dreamed a system of the universe that was almost correct as we know it today. Anaxagorus, 500 B. C., explained the eclipses of both sun and moon. Hipparchus, who flourished about the time of 200 B. C., became famous as an astronomer and was held by many in a more modern day, as the "Newton of Antiquity." He calculated the length of a year within six minutes, discovered the precession of the equinoxes and made the first catalogue and chart of the heavenly bodies.

Two hundred years after Pythagoras the celebrated school at Alexandria was established. At this school, A. D. 120, Ptolemy, a Greek wrote his great work, the Almagest, which for fourteen centuries was the principal text-book of astronomers. In this he gave what is known as the Ptolemaic system and was founded largely upon the materials gathered by earlier astronomers. After the destruction of the Alexandrian library by Christian fanatics, learning found a home among the Mohammedans. Bagdad on the Tigris, and Cordova, on the Gaudalquivir, became centers of science, literature and art. The treasures of Grecian knowledge were eagerly gathered by the caliphs. Fragments of Saracenic learning that have come down to us show that the Arabs had constructed astronomical tables and endeavored to perfect them by systematic observation.

About the beginning of the sixteenth century Copernicus broke away from the cumbersome astronomical systems of the Ptolemies and taught that he sun was the center of the solar system, and the diurnal motion of the earth and planets was but apparent and not real. He now simplified the science and reasoning from cause to effect he explained many of the appearances of movement as being directly the opposite of what previous astronomers had taught. He observed that as we rode or traveled swiftly in one direction, the trees and other objects appeared to be flying past us in the opposite direction and applying this reasoning to the heavenly bodies he investigated, then learned and taught that the sun did not move about the earth, but that the earth moved about the sun and that its revolution on its own axis produced the day and night. Tycho Brahe, a celebrated Danish astronomer further simplified the system of Copernicus and abolished the cycles and epicycles, but his mind being influenced by theology he again reverted to the notion that the earth was the central body of the solar system. Then came Kepler, a student of Brahe, who again took up the Copernican system and promulgated his three famous laws which are accepted by all modern astronomers. These were as follows:—

1. Planets revolve in ellipses with the sun at one focus.
2. A line connecting the center of the planet with the center of the sun passes over equal areas in equal times.
3. The squares of the times or revolution of the planets about the sun are proportioned to the cubes of their mean distances from the sun.

Contemporary with Kepler was the Florentine Philosopher, Galileo. The latter learning that a Dutch watchmaker had invented an instrument for making distant objects appear near, Galileo seized upon the principle and with a piece of lead pipe and a lens set at each end he invented the telescope, at first a very crude affair, but it was destined to bring about a revolution in astronomy. Galileo examined the moon. He saw its mountains and valleys and the deep shadows upon its plains. He discovered Jupiter and its four moons but he was met with such decided opposition and his fate is now a matter of history. In 1666 Newton appeared upon the scene and by observation noted the tendency of all bodies to fall back to the earth from immense distances, he discovered the law of motion and gravitation. This was applied to all bodies and from his experiments and observations he soon promulgated his theory, or rather a law which declared:—

Every particle of matter in the universe, from the smallest to the largest, attracts every other particle of matter with a force directly proportional to the product of their masses, and decreasing as the square of the distance between them increases.

From this we will now pass on to the methods used in measuring the distances, sizes and composition of the heavenly bodies.

To find the distance of the sun we start from a base line to find a point. In measuring the sun's diameter we start from a point to find a base line. This is done through a system of triangulation or better known as trigonometry. Before we can determine the sun's size we must know its distance from the earth. Let us now proceed with the task.

Draw an imaginary base line through the earth, not quite at its center and at either end where it comes to the earth's surface we construct an equatorial telescope. Place an observer at either end of the line. It is obvious that as the sun is setting for one observer, it is rising for the other but each observer can be placed at a point on the earth's surface, yet on opposite sides, when both can see it at exactly the same moment. From these points the base line is drawn. Here we have the base line to begin with and allowing for the earth's curvature we find it something less than 8,000 miles. Each observer will now focus his telescope upon the sun. Each telescope is pointing in a different direction and while both point upwards from the earth's surface, one is pointing in a direction inclined at an angle towards the other, and away from the base line. By placing these telescopes upon a graduated arc the precise angle formed by the telescope in the direction in which it is pointing from the base line can be accurately determined. All that now remains to be done is to calculate how far a line would have to be run out in the direction which the two telescopes are pointing from the base line to an imaginary point, with a base line between 6,000 and 8,000 miles long, and the point made by the conjunction of the two lines must, of a necessity, be the distance of the sun. This has been accurately determined as being 89,000,000 of miles in our northern winters and 93,000,000 of miles in our summers. The mean or average distance, would, therefore be, 91,000,000 of miles. This difference in the sun's distance from the earth is caused by the earth's orbit being an elliptic instead of a true circle.

Having found the sun's distance we now start out to ascertain its size. There is a very simple method for this experiment. Take a small disk or coin. Place it over one eye and close the other. It is obvious that the sun cannot be seen at all. Slowly move the disk forward and away from the eye and you will carry it but a short distance when the disk will appear to be just as large as the sun, from the point of the eye. What have we now. First, a point which is the center of the eye. A base line made by the diameter of the small disk. Measure the exact distance at which you held the disk from the eye and draw a line from the point of the eye on each side of the disk's diameter and you have an elongated triangle, This measurement has been perfect. Now make a simple mathematical calculation as to the width that another base line must be if the sides of the triangle you have just made are extended to a distance of 91,000,000 of miles and you have the diameter of the sun. Multiply this diameter by three and the circumference is given.

The great triumph of astronomical science came when the spectroscope was invented and spectrum analysis was able to determine the condition and composition of the sun and planetary bodies. The spectroscope consists of two small telescopes with